

10/075,954

- 2 -

Charles Andrianjara et al.

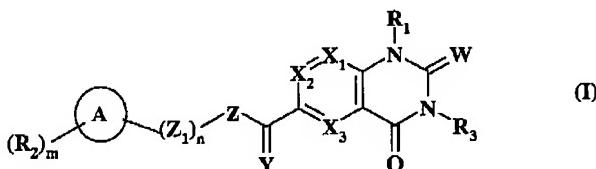
AMENDMENTS TO THE CLAIMS

The following listing of claims will replace all prior versions and listings of claims in the application.

Listing of claims:

Claim 1 (currently amended). A compound selected from those of formula

(I):



in which:

R₁ represents hydrogen, a group selected from:

—hydrogen, amine,

- (C_1-C_6)alkyl, (C_2-C_6)alkenyl, (C_3-C_6)alkynyl, mono(C_1-C_6)alkylamine (C_1-C_6)alkyl, di(C_1-C_6)alkylamine (C_1-C_6)alkyl, aryl, aryl(C_1-C_6)alkyl, heterocycle, and 3- to 6-membered cycloalkyl (C_1-C_6)alkyl, these groups being unsubstituted or substituted with one or more groups, which may be identical or different, selected from amino, (C_1-C_6)alkyl, cyano, halo(C_1-C_6)alkyl, C(=O)OR₄, OR₄ and SR₄, in which R₄ represents hydrogen or (C_1-C_6)alkyl,

W represents an oxygen atom, a sulphur atom, or a group =N-R', in which R' represents (C_1-C_6)alkyl, hydroxyl, or cyano,

X₁ and X₃ represent, independently of each other, a group -C-R₆ in which R₆ represents a group selected from hydrogen, (C_1-C_6)alkyl, amino,

10/075,954

- 3 -

Charles Andrianjara et al.

mono(C_1 - C_6)alkylamino, di(C_1 - C_6)alkylamino, hydroxyl, (C_1 - C_6)alkoxy, and halogen;

X_2 is nitrogen;

Y represents a group selected from oxygen atom, sulphur atom, -NH, and -N(C_1 - C_6)alkyl,

Z represents:

- an oxygen atom, a sulphur atom,
- or a group -NR₇ in which R₇ represents a group selected from hydrogen, (C_1 - C_6)alkyl, aryl(C_1 - C_6)alkyl, cycloalkyl, aryl, and heteroaryl, and
- when Y is an oxygen atom, a sulphur atom, or a group -N(C_1 - C_6)alkyl, Z optionally represents a carbon atom which is unsubstituted or substituted with a (C_1 - C_6)alkyl, an aryl, an aryl(C_1 - C_6)alkyl, an aromatic or non-aromatic heterocycle or a cycloalkyl,

n is an integer from 1 to 8 inclusive,

Z_1 represents -CR₈R₉, wherein R₈ and R₉, independently of each other, represent a group selected from hydrogen, (C_1 - C_6)alkyl, halo(C_1 - C_6)alkyl, halogen, amino, OR₄, SR₄ or C(=O)OR₄ in which R₄ represents a hydrogen or (C_1 - C_6)alkyl, and

- when n is greater than or equal to 2, the hydrocarbon chain Z_1 optionally contains one or more multiple bonds,
- and/or one of the carbon atoms in the hydrocarbon chain Z_1 may be replaced with an oxygen atom, a sulphur atom which is unsubstituted or substituted with one or two oxygen atoms, or a nitrogen atom which is unsubstituted or substituted with a (C_1 - C_6)alkyl,
- and when one of the carbon atoms in the hydrocarbon chain Z_1 is replaced with a sulphur atom which is unsubstituted or substituted with one or two oxygen

10/075,954

- 4 -

Charles Andrianjara et al.

atoms, then the group $-C(=Y)-Z-$ optionally may be absent in the general formula (I),

A represents an ~~a~~ group selected from:

- aromatic or non-aromatic, 5- or 6-membered monocycle comprising from 0 to 4 heteroatoms selected from nitrogen, oxygen and sulphur, and
- bicyclic, composed of two aromatic or non-aromatic, 5- or 6-membered rings, which may be identical or different, comprising from 0 to 4 heteroatoms selected from nitrogen, oxygen and sulphur,

m is an integer from 0 to 7 inclusive,

the group(s) R₂, which may be identical or different, is (are) selected from (C₁-C₆)alkyl, halogen, -CN, NO₂, SCF₃, -CF₃, -OCF₃, -NR₁₀R₁₁, -OR₁₀, -SR₁₀, SOR₁₀, -SO₂R₁₀, -(CH₂)_kSO₂NR₁₀R₁₁, -X₅(CH₂)_kC(=O)OR₁₀, -(CH₂)_kC(=O)OR₁₀, -X₅(CH₂)_kC(=O)NR₁₀R₁₁, -(CH₂)_kC(=O)NR₁₀R₁₁, and -X₄-R₁₂ in which:

- X₅ represents a group selected from oxygen, sulphur optionally substituted by one or two oxygen atoms, and nitrogen substituted by hydrogen or (C₁-C₆)alkyl,
- k is an integer from 0 to 3 inclusive,
- R₁₀ and R₁₁, which may be identical or different, are selected from hydrogen and (C₁-C₆)alkyl,
- X₄ represents a group selected from single bond, -CH₂-, oxygen atom, sulphur atom optionally substituted by one or two oxygen atoms, and nitrogen atom substituted by hydrogen atom or (C₁-C₆)alkyl group,

10/075,954

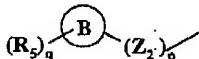
- 5 -

Charles Andrianjara et al.

- R₁₂ represents an aromatic or non-aromatic, heterocyclic or non-heterocyclic, 5- or 6-membered ring which is unsubstituted or substituted with one or more groups, which may be identical or different, selected from (C₁-C₆)alkyl, halogen, hydroxyl and amino, and when the ring is heterocyclic, it comprises from 1 to 4 heteroatoms selected from nitrogen, oxygen and sulphur;

R₃ represents a group selected from:

- hydrogen,
- (C₁-C₆)alkyl, (C₃-C₆)alkenyl, (C₃-C₆)alkynyl, these groups being unsubstituted or substituted with one or more groups, which may be identical or different, selected from amino, cyano, halo(C₁-C₆)alkyl, cycloalkyl, C(=O)NR₁₀R₁₁, C(=O)OR₁₀, OR₁₀, and SR₁₀, in which R₁₀ and R₁₁, which may be identical or different, represent hydrogen or (C₁-C₆)alkyl,
- and the group of formula :



- ✓ in which p is an integer from 0 to 8 inclusive,
- ✓ Z₂ represents -CR₁₃R₁₄ wherein R₁₃ and R₁₄, independently of each other, represent a group selected from hydrogen, (C₁-C₆)alkyl, phenyl, halo(C₁-C₆)alkyl, halogen, amino, OR₄, SR₄ and -C(=O)OR₄ in which R₄ represents hydrogen or (C₁-C₆)alkyl, and
 - when p is greater than or equal to 2, the hydrocarbon chain Z₂ optionally contains one or more multiple bonds,
 - and/or one of the carbon atoms in the hydrocarbon chain Z₂ may be replaced with an oxygen atom, a sulphur atom which is unsubstituted or substituted with one or two oxygen atoms, a nitrogen atom which is unsubstituted or substituted with a (C₁-C₆)alkyl, or a carbonyl group,

10/075,954

- 6 -

Charles Andrianjara et al.

- ✓ B represents a group selected from:
 - an aromatic or non-aromatic 5- or 6-membered monocycle comprising from 0 to 4 heteroatoms selected from nitrogen, oxygen and sulphur, and
 - a bicyclic, composed of two aromatic or non-aromatic, 5- or 6-membered rings, which may be identical or different, comprising from 0 to 4 heteroatoms selected from nitrogen, oxygen and sulphur,
- ✓ q is an integer from 0 to 7 inclusive,
- ✓ the group(s) R₅, which may be identical or different, is (are) selected from (C₁-C₆)alkyl, halogen, CN, NO₂, CF₃, OCF₃, -(CH₂)_kNR₁₅R₁₆, -N(R₁₅)C(=O)R₁₆, -N(R₁₅)C(=O)OR₁₆, -N(R₁₅)SO₂R₁₆, -N(SO₂R₁₅)₂, -OR₁₅, -S(O)_{k1}R₁₅, -SO₂-N(R₁₅)-(CH₂)_{k2}-NR₁₆R₁₇, -(CH₂)_kSO₂NR₁₅R₁₆, -X₇(CH₂)_kC(=O)OR₁₅, -(CH₂)_kC(=O)OR₁₅, -C(=O)O-(CH₂)_{k2}-NR₁₅R₁₆, -C(=O)O-(CH₂)_{k2}-C(=O)OR₁₈, -X₇(CH₂)_kC(=O)NR₁₅R₁₆, -(CH₂)_kC(=O)NR₁₅R₁₆, -R₁₉-C(=O)OR₁₅, -X₆-R₂₀, and -C(=O)-R₂₁-NR₁₅R₁₆ in which :
 - X₇ represents a group selected from oxygen atom, sulphur atom optionally substituted by one or two oxygen atoms, and nitrogen atom substituted by a hydrogen atom or a (C₁-C₆)alkyl group,
 - k is an integer from 0 to 3 inclusive,
 - k1 is an integer from 0 to 2 inclusive,
 - k2 is an integer from 1 to 4 inclusive,

10/075,954

- 7 -

Charles Andrianjara et al.

- R_{15} , R_{16} and R_{17} , which may be identical or different, are selected from hydrogen and $(C_1-C_6)alkyl$,
- R_{18} represents a group selected from $(C_1-C_6)alkyl$, $-R_{21}-NR_{15}R_{16}$, $-R_{21}-NR_{15}-C(=O)-R_{21}-NR_{16}R_{17}$, and $-C(=O)O-R_{21}-NR_{15}R_{16}$ in which R_{21} represents a linear or branched $(C_1-C_6)alkylene$ group, and R_{15} , R_{16} and R_{17} are as defined hereinbefore,
- R_{19} represents a $(C_3-C_6)cycloalkyl$ group,
- X_6 represents a group selected from single bond, $-CH_2-$, oxygen atom, sulphur atom optionally substituted by one or two oxygen atoms, and nitrogen atom substituted by hydrogen atom or $(C_1-C_6)alkyl$ group,
- R_{20} represents an aromatic or non-aromatic, heterocyclic or non-heterocyclic, 5- or 6-membered ring, which is unsubstituted or substituted with one or more groups, which may be identical or different, selected from $(C_1-C_6)alkyl$, halogen, hydroxyl, oxo, cyano, tetrazole, amino, and $-C(=O)OR_4$ wherein R_4 represents hydrogen or $(C_1-C_6)alkyl$, and, when the ring is heterocyclic, it comprises from 1 to 4 heteroatoms selected from nitrogen, oxygen and sulphur,

with the proviso that when X_4 represents a nitrogen atom, X_2 cannot represent a carbon atom substituted with a methyl group or with $NH-CH_3$; optionally, the racemic forms thereof, isomers thereof, N-oxides thereof, and the pharmaceutically acceptable salts thereof.

Claim 2 (canceled).

Claim 3 (currently amended). A compound of formula (I) according to Claim 1 characterized in that:

10/075,954

- 8 -

Charles Andrianjara et al.

n is an integer from 1 to 6 inclusive,

Z₁ represents -CR₈R₉ wherein R₈ represents a hydrogen atom and R₉ represents a hydrogen atom or a methyl group, and

- when n is greater than or equal to 2, the hydrocarbon chain Z₁ optionally contains a double bond,
- or, one of the carbon atoms in the hydrocarbon chain Z₁ may be replaced with an oxygen atom, or a sulphur atom which is unsubstituted or substituted with one or two oxygens,

A represents a group selected from phenyl, pyridyl, thienyl, imidazolyl, furyl, and piperidyl, 1,3-benzodioxolyl, benzodioxinyl, benzothienyl, benzofuryl, benzofurazanyl, 2,1,3-benzothiadiazolyl, and indolyl,

m is an integer from 0 to 7 inclusive,

the group(s) R₂, which may be identical or different, is (are) selected from (C₁-C₆)alkyl, halogen, -CN, -CF₃, -OCF₃, -NR₁₀R₁₁, -OR₁₀, -SR₁₀, -SO₂R₁₀,

-(CH₂)_kSO₂NR₁₀R₁₁, -X₅(CH₂)_kC(=O)OR₁₀, -(CH₂)_kC(=O)OR₁₀,

-X₅(CH₂)_kC(=O)NR₁₀R₁₁, -(CH₂)_kC(=O)NR₁₀R₁₁, and -X₄-R₁₂ in which:

- ✓ X₅ represents O, S or NH,
- ✓ k is an integer from 0 to 3 inclusive,
- ✓ R₁₀ and R₁₁, identical or different, are selected from hydrogen and (C₁-C₆)alkyl,
- ✓ X₄ represents -CH₂- or an oxygen atom,
- ✓ R₁₂ represents a phenyl group which is unsubstituted or substituted with one or more groups, which may be identical or different, selected from (C₁-C₆)alkyl, halogen, hydroxyl and amino,

10/075,954

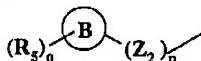
- 9 -

Charles Andrianjara et al.

optionally, the racemic forms thereof, isomers thereof, N-oxides thereof, and the pharmaceutically acceptable salts thereof.

Claim 4 (currently amended). A compound of formula (I) according to Claim 1 characterized in that:

R₃ represents hydrogen, (C₁-C₆)alkyl or the group of formula:



- in which p is an integer from 0 to 3 inclusive,
- Z₂ represents -CR₁₃R₁₄ wherein R₁₃ and R₁₄, independently of each other, represent a group selected from hydrogen, methyl, or phenyl, and
 - when p is greater than or equal to 2, the hydrocarbon chain Z₂ optionally contains one double bond,
 - or one of the carbon atoms in the hydrocarbon chain Z₂ may be replaced with an oxygen atom, a sulphur atom which is unsubstituted or substituted with one or two oxygen atoms, a nitrogen atom which is unsubstituted or substituted with a (C₁-C₆)alkyl, or a carbonyl group,
- B represents a group selected from phenyl, pyridyl, thiienyl, imidazolyl, furyl, 1,3-benzodioxolyl, benzodioxinyl, benzothienyl, benzofuryl, 2,1,3-benzothiadiazolyl, benzofurazanyl, naphthyl, and indolyl,
- q is an integer from 0 to 3 inclusive,
- the group(s) R₅, which may be identical or different, is (are) selected from (C₁-C₆)alkyl, halogen, CN, NO₂, CF₃, -(CH₂)_kNR₁₅R₁₆, -N(R₁₅)C(=O)R₁₆, -(R₁₅)C(=O)OR₁₆, -N(R₁₅)SO₂R₁₆, -N(SO₂R₁₅)₂, -OR₁₅, -S(O)_{k1}R₁₅, -SO₂-N(R₁₅)-(CH₂)_{k2}-NR₁₆R₁₇, -(CH₂)_kSO₂NR₁₅R₁₆,

10/075,954

- 10 -

Charles Andrianjara et al.

-X₇(CH₂)_kC(=O)OR₁₅, -(CH₂)_kC(=O)OR₁₅, -C(=O)O-(CH₂)_{k2}-NR₁₅R₁₆,

-X₇(CH₂)_kC(=O)NR₁₅R₁₆, and -(CH₂)_kC(=O)NR₁₅R₁₆ in which :

- X₇ is S, O or NH,
- k is an integer from 0 to 3 inclusive,
- k1 is an integer from 0 to 2 inclusive,
- k2 is an integer from 1 to 4 inclusive,
- R₁₅, R₁₆ and R₁₇, which may be identical or different, are selected from hydrogen and (C₁-C₆)alkyl,

optionally, the racemic forms thereof, isomers thereof, N-oxides thereof, and the pharmaceutically acceptable salts thereof.

Claims 5 to 8 (canceled).

Claim 9 (previously presented). A compound of formula (I) according to

Claim 1 characterized in that :

W represents an oxygen atom,

Y represents an oxygen atom,

Z represents a NH group,

Z₁ represents a methylene group,

and n is equal to one,

optionally, the racemic forms thereof, isomers thereof, N-oxides thereof, and the pharmaceutically acceptable salts thereof.

Claims 10 and 11 (canceled).

Claim 12 (previously presented). A compound of formula (I) according to

Claim 1 characterized in that :

X₁ and X₃ represent each a -CH group,

and

10/075,954

- 11 -

Charles Andrianjara et al.

optionally, the racemic forms thereof, isomers thereof, N-oxides thereof, and the pharmaceutically acceptable salts thereof.

Claim 13 (currently amended). A compound of formula (I) according to Claim 1 characterized in that :

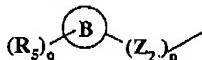
A represents a group selected from phenyl, and pyridyl, 1,3-benzodioxolyl, and benzofurazanyl,

m is equal to 0 or 1,

and R₂ represents a group selected from (C₁-C₆)alkoxy, hydroxy, halogen, and (C₁-C₆)thioalkoxy,

optionally, the racemic forms thereof, isomers thereof, N-oxides thereof, and the pharmaceutically acceptable salts thereof.

Claim 14 (previously presented). A compound of formula (I) according to Claim 1 characterized in that R₃ represents a group of formula :



in which:

p is equal to 1,

Z₂ represents a methylene group,

B represents a group selected from phenyl, pyridyl, 1,3-benzodioxolyl, and benzofurazanyl,

q is an integer from 0 to 2 inclusive,

and R₅ represent(s) a group selected from halogen, CN, -(CH₂)_kNR₁₅R₁₆,

-S(O)_{k1}R₁₅, -(CH₂)_kSO₂NR₁₅R₁₆, -(CH₂)_kC(=O)OR₁₅, -(CH₂)_kC(=O)NR₁₅R₁₆, and

-X₆-R₂₀, in which :

- k is an integer from 0 to 1 inclusive,

- k1 is an integer from 0 to 2 inclusive,

- R₁₅ and R₁₆, which may be identical or different, are selected from hydrogen and (C₁-C₆)alkyl,

10/075,954

- 12 -

Charles Andrianjara et al.

- X_6 represents a bond,
- R_{20} represents a 5-membered heterocyclic ring comprising from 3 to 4 heteroatoms selected from oxygen and nitrogen and optionally substituted with a methyl group or an oxo group,
optionally, the racemic forms thereof, isomers thereof, N-oxides thereof, and the pharmaceutically acceptable salts thereof.

Claim 15 (currently amended). A compound of formula (I) according to Claim 1, which is:

- ~~- 1,3-Dimethyl-2,4-dioxo-1,2,3,4-tetrahydro-pyrido[3,4-*d*]pyrimidine-6-carboxylic acid (1,3-benzodioxol-5-ylmethyl)-amide;~~
- 3-Benzyl-1-methyl-2,4-dioxo-1,2,3,4-tetrahydro-pyrido[3,4-*d*]pyrimidine-6-carboxylic acid (1,3-benzodioxol-5-ylmethyl)-amide,
- Methyl 4-[6-(4-Methoxy-benzylcarbamoyl)-1-methyl-2,4-dioxo-1,4-dihydro-2*H*-pyrido[3,4-*d*]pyrimidin-3-ylmethyl]-benzoate,
- 4-[6-(4-Methoxy-benzylcarbamoyl)-1-methyl-2,4-dioxo-1,4-dihydro-2*H*-pyrido[3,4-*d*]pyrimidin-3-ylmethyl]-benzoic acid,
- 4-[6-(3-Methoxy-benzylcarbamoyl)-1-methyl-2,4-dioxo-1,4-dihydro-2*H*-pyrido[3,4-*d*]pyrimidin-3-ylmethyl]-benzoic acid, and
- 3-(4-Cyano-benzyl)-1-methyl-2,4-dioxo-1,2,3,4-tetrahydro-pyrido[3,4-*d*]pyrimidine-6-carboxylic acid 4-methoxy-benzylamide.

Claims 16 to 28 (canceled).

Claim 29 (currently amended). A pharmaceutical composition comprising a compound according to any one of ~~Claims 1, 2, 4, 8, 9, 11-15~~ Claims 1, 3, 4, 9, or 11-15 inclusive and a pharmaceutically acceptable excipient.

Claims 30 and 36 (canceled).

10/075,954

- 13 -

Charles Andrianjara et al.

Claim 37 (currently amended). A method for treating a disease or complaint involving a therapy by inhibition of MMP-13 characterized in that the disease or the complaint is arthritis, the method comprising the administration of an effective amount of a compound according to any one of Claims 1, 3, 4, 8, 9, 11-16 Claims 1, 3, 4, 9, or 11-15 inclusive to a patient having arthritis.

Claim 38 (currently amended). A method for treating according to Claim 37, characterized in that the disease is osteoarthritis.

Claim 39 (currently amended). A method for treating according to Claim 37, characterized in that the disease is rheumatoid arthritis.